

Policy Measures for Improving Air Quality in the U.S.

The 4th SINO-US Workshop on Motor Vehicle Pollution Prevention and Control

U.S. Environmental Protection Agency
Office of Transportation and Air Quality

Mission and Focus

- EPA
 - The mission of EPA is to protect human health and the environment
- The Office of Transportation and Air Quality (OTAQ)
 - The mission of OTAQ is to protect human health and the environment by:
 - Reducing air pollution and greenhouse gas emissions from mobile sources and the fuels that power them
 - Advancing clean fuels and technology
 - Encouraging business practices and travel choices that minimize emissions
 - Operate the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan
 - Conduct official government certification and fuel consumption testing
 - Test procedure development and technology evaluation

EPA's Authority to Regulate Emissions

- The U.S. Congress passed the Clean Air Act and subsequent amendments to authorize federal programs to control air pollution
 - First Clean Air Act of 1963 – lead to the investigation of possible air pollution controls and techniques for air quality monitoring
 - Air Quality Act of 1967
 - Allowed California to continue set their own standards
 - Clean Air Act of 1970 -The enactment of the Clean Air Act of 1970 (1970 CAA) resulted in a major shift in the federal government's role in air pollution control. This legislation authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources.
 - Not a direct result of Clean Air Act but EPA established December 2, 1970
 - Consolidated environmental protection responsibilities into one agency
 - Did not include standards for heavy-duty but did require a study into possible standards for vehicles and engines in conjunction with National Academy of Sciences
 - EPA adopts California standards
 - Clean Air Act Amendments of 1977 -The 1977 Amendments primarily concerned provisions for the Prevention of Significant Deterioration (PSD) of air quality in areas attaining the National Ambient Air Quality Standards (NAAQS).
 - Required emissions standards for 1983 and later models years which result in the greatest reduction achievable considering cost, energy, and safety
 - Required 4 year lead time, 3 year stability of regulations
 - Authorized study of PM emissions
 - Clean Air Act Amendments of 1990 - The 1990 CAAA substantially increased the authority and responsibility of the federal government. Led to cleaner fuels, new vehicle and nonroad emissions standards
 - Prescribed 1998 NOx standard
 - Nonroad emission standards

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EPA's Authority to Ensure Compliance with Emission Standards

- The Clean Air Act provided structure for EPA to establish compliance programs
 - Required engines to be certified annually
 - Cannot introduce an uncertified engine for sale
 - Including imported engines
 - Prohibited emission control systems from releasing unregulated emissions which could be hazardous to public
 - NH3 from Selective Catalytic Reduction systems, for example
 - Authorized EPA to test or require to be tested any new engine to determine if engine complies with emission standards
 - Allows for confirmatory certification testing
 - Allows for selective enforcement auditing
 - Authorizes EPA to test a substantial number of properly maintained and used in-use engines to determine if such engines comply with emissions standards
 - EPA can require manufacturer to fix in-use engines
 - Warranty
 - Prescribed period of time were emission control systems should be free of defects

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Regulatory Process

- Advanced Notice of Proposed Rule Making (ANPRM)
 - Not always used, least formal part of process
 - Seeks comments on the scope of the rulemaking
 - May have public meetings at various locations in the U.S.
 - Comments submitted to public docket
- Notice of Proposed Rule Making NPRM
 - Draft regulation with proposed regulatory language
 - Reviewed by Office of Management and Budget prior to release
 - Comments accepted for sixty days from publication
 - Comments compiled in public docket
- Final Rule
 - Based on comments received, the final rule is an updated version of the NPRM
 - The rule cannot contain concepts not proposed in the NPRM
 - Reviewed by Office of Management and Budget prior to release
 - Response to comments portion of the rule, addresses comments received during NPRM
 - Rule becomes effective 60 days after published, unless challenged in court
- Amending Rules
 - Rules can be amended starting with NPRM
 - If amendments are corrections or noncontroversial, Direct Final Rule process can be used
 - Becomes effective 60 days after published
 - If comments received, go through NPRM process

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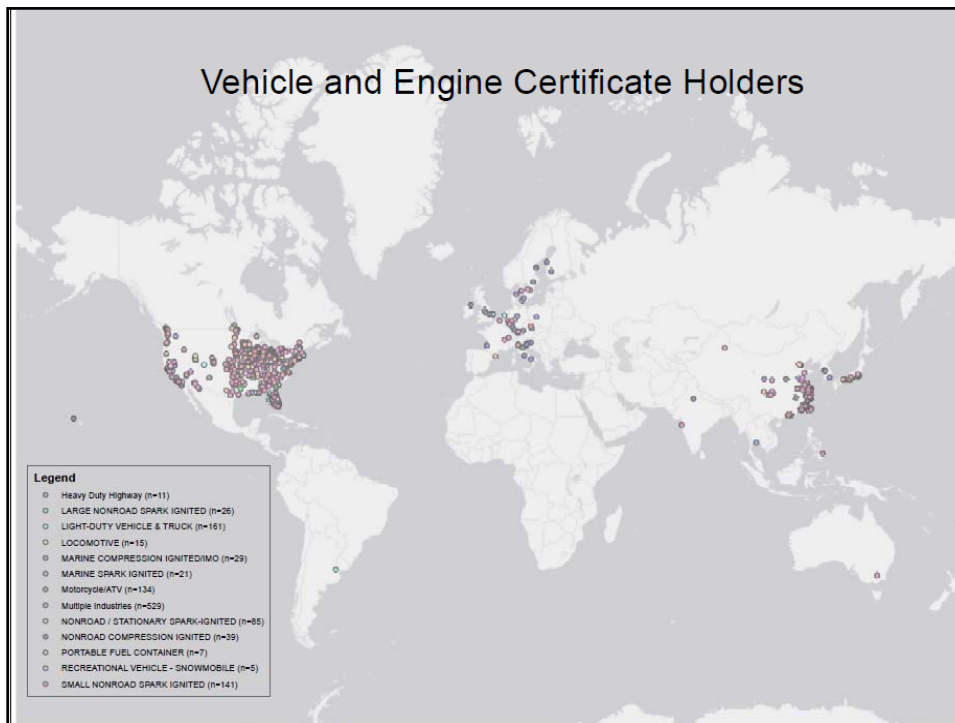
Vehicles and Engines Overview

- Highway Vehicles and Engines
 - Cars, trucks, vans, SUVs, motorcycles
 - Heavy duty trucks, buses
- Nonroad Engines, Vehicles, and Equipment
 - Large diesel (construction equipment)
 - Large gas (forklifts, compressors, air ground service equipment)
 - Handheld utility engines (chainsaws, leaf-blowers, trimmers)
 - Non handheld utility engines (lawnmowers, garden tractors)
 - Marine (outboard/inboard motors, jet skis)
 - Recreational vehicles (snowmobiles, ATVs, off-road motorcycles)
 - Locomotives
- Large “case load” growing fast
 - In 2007 - 350 manufacturers, 2,600 certificates annually
 - Currently – 670 manufacturers, >4,100 certificates

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Reconciling Diesels with the Environment: EPA's National Clean Diesel Campaign

- Systems approach– fuel change (ULSD) enables clean engine technology (exhaust aftertreatment)
- Large environmental benefits
- Responsive to needs of States to meet air quality goals
- Collaborative process
- EPA standard-setting rulemakings are enablers for collaborative partnerships with industry and state/local governments



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EPA's National Clean Diesel Campaign

Tier 2 Light-Duty
 Final rule – 1999
 Fully phased in – 2009
 Diesels held to same stringent standards as gasoline vehicles



These standard-setting rulemakings are key enablers for collaborative partnerships with industry and state & local governments



Heavy-Duty Highway
 Sales – 800,000 engines / yr
 Fuel – 40B gallons / yr
 Final rule – 2000
 Fully phased in – 2010



Locomotive / Marine
 Sales – 40,000 marine engines / yr,
 1,000 locomotives / yr
 Fuel – 6B gallons / yr
 Final rule – 2008
 Fully phased in – 2017

Nonroad Diesel
 Sales – over 650,000 engines / yr
 Fuel – 12B gallons / yr
 Final rule – 2004
 Fully phased in – 2015



Note: Sales and fuel usage vary year-to-year; these figures are for comparison purposes only

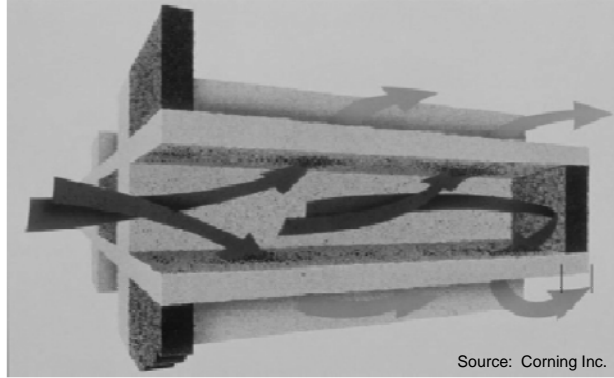


Millions of Diesel Particulate Filters (DPFs) are now in use



Source: DieselPower Magazine

Enabling Near Zero Emission Levels

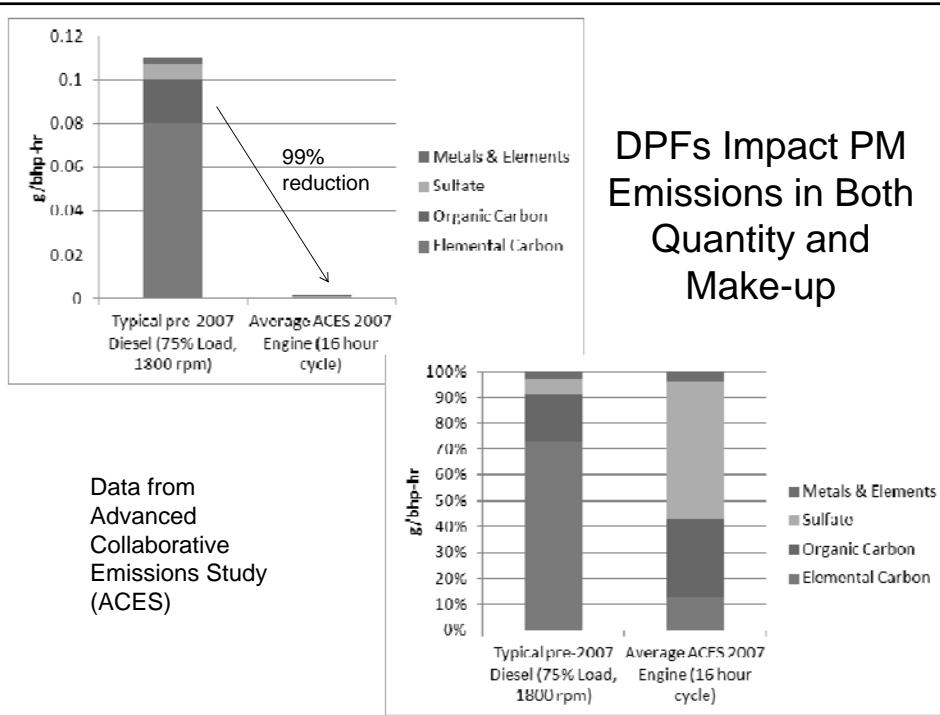


Catalyzed Diesel Particulate Filters can eliminate 99% of solid particles (soot & metals) and >90% of semi-volatile hydrocarbons

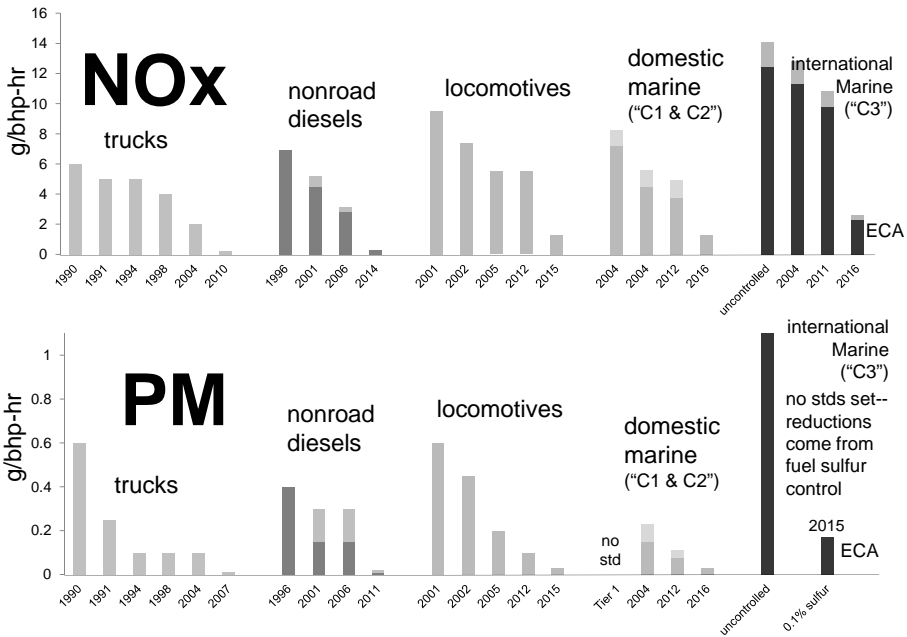
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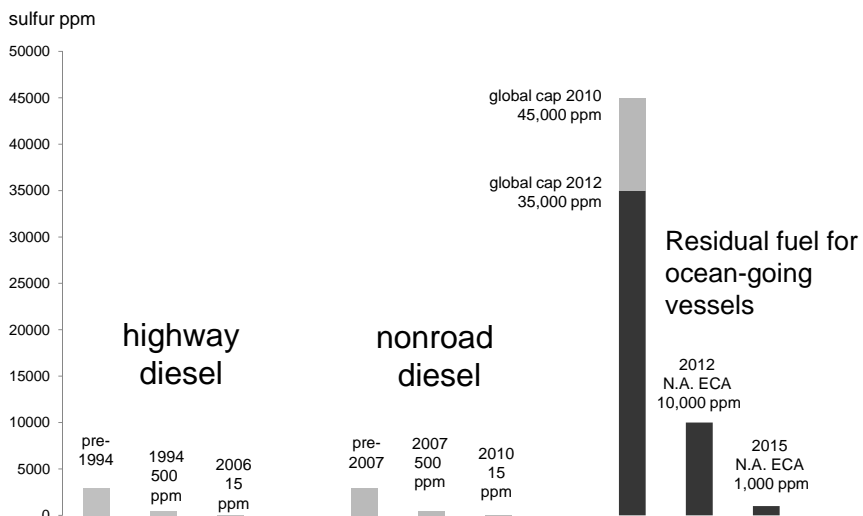
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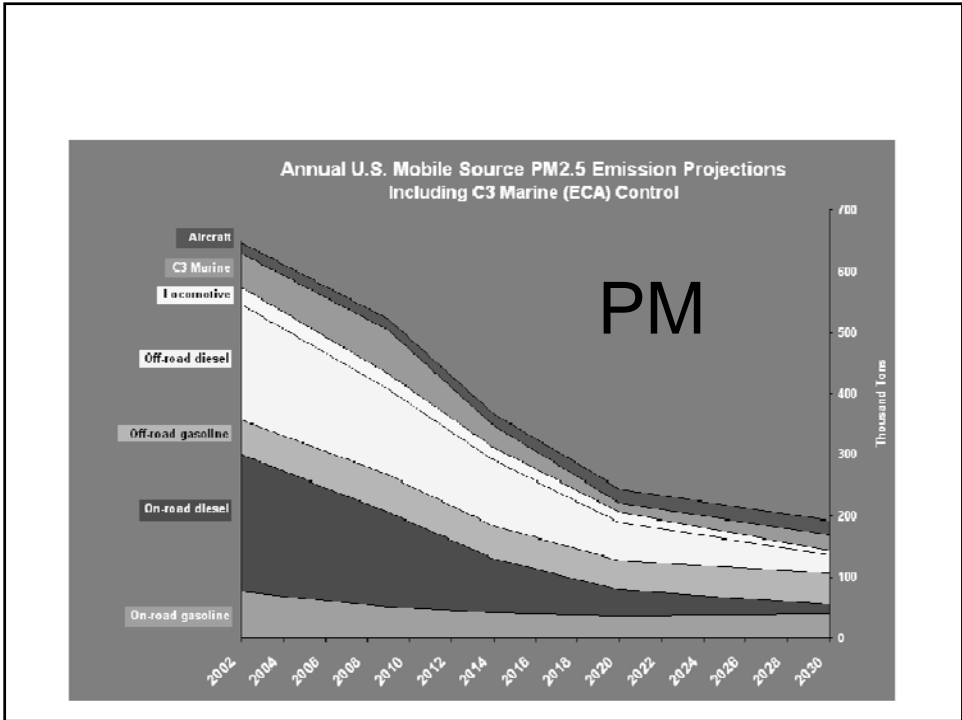
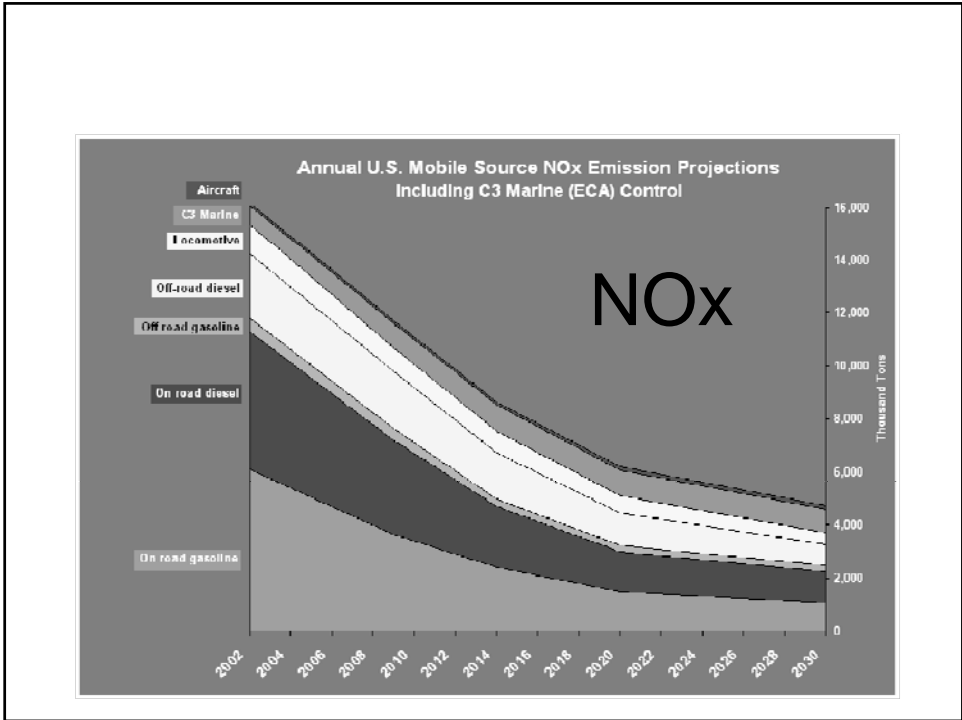


Progress in Diesel Emissions Standards



Clean Diesel Fuel Enables Clean Diesel Engines





Ensuring the Health Benefits We Have Promised

	Light Duty Tier 2	Heavy Duty 2007	Nonroad Diesel Tier 4	Locomotive & Marine Diesel	Ocean Vessel Strategy	Totals
NOx (short tons)	2,800,000	2,600,000	738,000	795,000	1,200,000	8,133,000
PM2.5 (short tons)	36,000	109,000	129,000	27,000	143,000	444,000
VOC (short tons)	401,000	115,000	34,000	43,000	0	593,000
SOx (short tons)	281,000	142,000	376,000	0	1,300,000	2,099,000
Total Cost (billion)	\$5.3	\$4.2	\$1.7	\$0.7	\$3.1	\$15
Total Monetized Benefits (billion)	\$25	\$70	\$80	\$11	\$110	\$296
Avoided Premature Mortality	4,300	8,300	12,000	1,400	13,000	39,000
Avoided Hospital Admissions	3,000	7,100	8,900	870	12,400	32,270
Avoided Lost Work Days	700,000	1,500,000	1,000,000	120,000	1,400,000	4,720,000

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Importance of Compliance

- **Clean Air Benefits**
 - 1990 Clean Air Act Amendments:
 - From 1990-2020, 4.2 million lives saved, benefit outweighs costs ~30:1
 - In 2030:
 - Eliminate more than 38,000 premature deaths
 - Realize more than \$290 billion in health and welfare benefits
 - The diesel programs alone are projected to result in:
 - 34,700 fewer premature deaths
 - \$271 billion in health and welfare benefits
- **Level Playing Field**
 - Vehicle, engine, and fuels industries are highly competitive, especially in today's global environment
 - *Regulated industries expect and rely on EPA to protect their investment in emissions compliance*

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